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RECORDS OF WESTERN SPECIES OF PERDITA WITH DESCRIPTIONS OF TWO NEW SPECIES (HYMENOPTERA)

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No species of Penurgid bees of the genus Perdita have been recorded from the Pacific Northwest except *P. albipennis* Cresson from the State of Washington, and even *albipennis* has been considered an adventive species that had followed the sunflower in its western dispersion. It is interesting, therefore, to note the occurrence of two species in Oregon and another from Vancouver Island, British Columbia. The Oregon species were found east of the Cascades in a region where the fauna is distinctly of a desert type much like that of Nevada. Dr. Cockerell has recorded many species of bees from this fauna even as far north as Pasco, Washington. The Vancouver Perdita, however, belongs distinctly to another fauna that has been developed in the more humid region of the Pacific Coast.

1. Perdita zebrata Cresson

Two females and one male, collected June 30, 1927, at Nixon, Nevada (E. P. Van Duzee). These have the pale markings bright yellow, but the male genitalia agree exactly with typical *zebrata* from Colorado and New Mexico.

2. Perdita zonalis Cresson

Three females and five males, collected August 10, 1926, at Sisters, Oregon; and one male, collected August 11, 1926, at White Branch Meadow, Three Sisters, Oregon, 5675 feet (H. A. Scullen).

These specimens I am unable to separate satisfactorily from the little known *P. zonalis* Cress., although they may ultimately prove to be separable when *zonalis* becomes better known. The females agree well with the original description and with

Cockerell's notes on one of the types, except that the first tergite of abdomen has a continuous dark band across the middle instead of a small black spot on each side. I had thought, after reading what has been published about *zonalis,* that the wings were colored as in *P. zebrata* Cress., that is, more or less milky hyaline with very pale veins. Having recently seen the types at Philadelphia I can affirm, however, that the wings are slightly tinted with fuscous with the veins distinctly brownish.

The male, previously unknown, runs to *P. zebrata* Cress. in Cockerell's table (1896) and is easily distinguished from that species by the darker wings and veins, the much evener banding of abdomen and by having the hind femora yellow with only a small dark spot above at apex.

Male. General form as in other species of the *zebrata* group. Head not enlarged, somewhat wider than thorax, slightly wider than long and well rounded on the sides and above. Cheeks narrow and simple. Eyes about twice as long as wide, a little wider toward lower end than above, and with the inner orbits very slightly converging below. Clypeus moderately convex and projecting for about one-half of its length in front of ocular line; the disk about one-half wider than high, with its dorsal margin rather broadly transverse between dog-ear plates; the lateral extensions short, very broad, well inflexed anteriorly and approximately one-half visible in frontal view of head. Dog-ear plates about twice as long as wide and rather acute at lower end. Supraclypeal plate as long as broad, slightly narrowed above, where it ends between the antennal sockets in a sharp declivity toward the frons. The declivity strongly tectiform and somewhat carinate medially as it approaches surface of frons on to which it intrudes only for a short distance. Frons with a distinct, impressed, shining, median line reaching to, or nearly to, tectiform declivity and becoming more evident close to the median ocellus. Lateral plates of face rather strongly widened at lower end, and opposite middle of dog-ear plates, each covering slightly less than one-fourth the total width of face. Mandibles curved, tapering, simple and acute at apex and reaching to far margin of labrum. Abdomen oval, convex, about twice as long as broad and with the apex moderately reflexed toward venter. Seventh tergite broadly rounded at apex. Membrane of wings rather densely covered, especially in apical field, with very fine short setæ. Stigma narrowly lanceolate, a little shorter than first submarginal cell and emitting radius distinctly beyond the middle. Marginal cell considerably wider and somewhat shorter than stigma, with the apical truncation more or less oblique and the poststigmatal and substigmatal parts about equal. Second submarginal cell narrowed one-half to two-

thirds above. Recurrent veins interstitial with the intercubiti. Subdiscoidal vein and second recurrent, except a short spur above, obsolete. Claws rather large, strongly bent, cleft and with the inner tooth a little thicker and considerably shorter than outer tooth.

Frons very finely granular tessellate, subopaque, with obscure, minute, sparse punctures. Vertex similarly sculptured but a little less dull and impunctate. Face below antennæ smooth, shining and sparsely and finely punctured. Cheeks tessellate, shining and rather closely punctured except in a smooth strip along orbits. Thorax polished and shining, but disk of propodeum distinctly tessellate. Punctures of mesonotum fine and very sparse, and those of mesopleura similar and much closer. Abdomen with the usual microscopic lineolate sculpture. Pubescence whitish and fine; dense and moderately long on cheeks, similar but thinner on occiput, pleura and sides of propodeum, and rather sparse and shorter on mesonotum and face.

Head and thorax dark bluish green, with the frons and vertex greener and the propodeum dark blue. Mandibles except reddish tips, labrum, and face below antennæ, except dog-ear plates, bright yellow. Dog-ear plates black with a small yellow spot above, or sometimes almost all yellow except around the margins. Lateral marks of face obliquely truncate above about from the middle of outer margin of antennal sockets to a point on orbits just below the foveæ. Cheeks narrowly margined with yellow anteriorly, on margin of gular cavity for a short distance and along posterior orbits nearly to middle of eyes. Prothorax mainly dark, but tubercles, and frequently narrow anterior margin and a small spot at posterior corners of notum, yellow. Thorax otherwise entirely dark. Abdomen bright yellow, with the venter nearly or quite immaculate and the seventh tergite rather brownish yellow. First tergite black, but often with a small yellow spot on each side subapically that joins laterally with a thin marginal yellow line running toward the base. Basal band on second tergite, mostly covered by preceding segment but triangularly enlarged on each side to cover the lateral foveæ, a rather broad band at juncture of tergites 2-3 to 5-6, and broad band on apical margin of six piceous, or varying to brownish on apical segments. Dark bands on tergites 2 to 4 slightly bulging anteriorly just before the end on each side. Yellow intervals about as wide as the dark bands, reaching to lateral margins but more or less constricted laterally on tergites 2 to 4. More rarely the yellow interval on two is reduced to a narrow basal band entirely enclosed and ending far from lateral margins, and those on three and four at the same time more or less nubilously cut off at lateral margins. Legs bright yellow, the front and middle tarsi paler, a large blotch above and behind on front and middle femora and tibiæ, a spot at apex of hind femora above, hind tibiæ except beneath and hind tarsi, except under side of basitarsus, brownish fuscous. Labio-maxillary structure piceous but the

maxillary blades, maxillary palpi and the glossa more or less testaceous. Antennæ fuscous or dark brown, becoming paler toward apex, the scape except a spot above at apex and pedicel beneath bright yellow, and the flagellum rather broadly dull yellowish beneath, except last joint which is nearly all brown. Tegulæ hyaline with a yellow spot at base. Wings hyaline but just perceptibly tinted with fuscous; veins and margins of stigma rather pale brown, subcosta much darker and the stigma otherwise pallid.

Length about 4.25 to 5.0 mm.

3. **Perdita oregonensis** Timberlake, new species

Two males (holotype and paratype), collected August 10, 1926, at Sisters, Oregon (H. A. Scullen).

The male runs to couplet 42 in Cockerell's table (1896), and among other species since described that run to the same place, it is very similar and closely allied to *P. stottleri* Ckll. It differs from *stottleri* in having the head much wider (considerably wider than long, but in *stottleri* about as wide as long), the white pubescence of head and thorax somewhat longer, denser and more conspicuous, the frons less densely sculptured and more shining, the mesonotum less distinctly tessellate and more shining, and in having one more dark band on abdomen. These distinctions are rather weak, but there are also differences in the genitalia which indicate two distinct species, although the genitalia show that the two are very closely allied.

Male. General form of body as in other species of the ***zebrata*** group. Head not enlarged, but wider than thorax, considerably wider than long, well rounded on sides and gently rounded above. Cheeks rather narrow and simple. Eyes about twice as long as wide, broader toward lower end than above and having the inner orbits very slightly converging below. Clypeus convex and only slightly projecting beyond ocular line; the disk about one-half broader than high, rather well rounded above but subtransverse medially between dog-ear plates; the lateral extensions very broad and well inflexed anteriorly but still visible in large part in frontal view of head. Dog-ear plates about one-half longer than wide and obliquely truncate at lower end. Supraclypeal plate about one-third wider than high, extending upward between antennal sockets and ending in a sharp declivity toward frons. This declivity extending only a short distance on to frons and rather weakly tectiform. Lateral plates of face somewhat widened at lower end and opposite middle of dog-ear plates, each covering about one-fourth the total width of face. Frons on dorsal half with a strongly impressed shining median line. Mandibles rather long, curved, tapering to simple

acute apex and reaching somewhat beyond far margin of labrum. Antennæ ordinary, the scape about twice as long as thick and the middle joints of flagellum about as long as thick. Abdomen oval, convex, about twice as long as wide, with the apex moderately reflexed toward venter. Seventh tergite with a rather narrow rounded apex. Membrane of wings rather densely covered in apical field with fine weak setæ. Stigma narrowly lanceolate, nearly as long as first submarginal cell and emitting radius somewhat beyond the middle. Marginal cell about as long as stigma, with the apical truncation slightly oblique and the substigmatal and poststigmatal parts about equal. Second submarginal cell narrowed about one-half above. First and second recurrent veins either interstitial, or very nearly so, with the intercubiti. Subdiscoidal and second recurrent veins obsolete, except a short stub of the recurrent vein above and a small section at its middle. Claws rather large, strongly bent and cleft with the inner tooth about two-thirds as long as outer tooth.

Face below antennæ smooth and obscurely punctured, the punctures of clypeus very sparse. Frons strongly and finely tessellate, moderately shining and rather closely and finely punctured. Cheeks smooth and closely punctured except in a polished strip along the orbits. Thorax polished and shining, but the propodeum rather delicately tessellate. Mesoscutum and scutellum with fine, widely spaced punctures, which become more numerous anteriorly on the scutum. Mesopleura with numerous microscopic punctures. Abdomen shining and with the usual microscopic lineolate sculpture. Pubescence white, rather abundant and conspicuous; long and rather dense on cheeks, occiput, metanotum, pleura and sides of propodeum, and somewhat shorter and considerably thinner on face and mesonotum.

Head and thorax very dark brassy green, becoming bluish on pronotum and propodeum and to a less extent on the pleura. Mandibles except reddish tips, labrum, mark on cheeks anteriorly, and entire face below level of antennæ, except the usual clypeal dots, bright yellow. Mark on cheeks rather large, broadening toward gular cavity, and continued as a thin line along orbits not quite to middle of eyes. Lateral marks of face extending along orbits not quite to level of frontal foveæ and obliquely truncate above to outer upper margin of antennal sockets, but sometimes the truncation is broken within by a rather wide extension of the green along the outer side of the antennal sockets to the level of their lower margin. Prothorax yellow with a rather broad bluish transverse band which broadens medially to cover the posterior margin of pronotum except at sides, and on each pleuron sends a slender subhyaline dark streak to the tubercle. Abdomen yellow above and beneath, with a piceous band at juncture of tergites 1-2 to 5-6. First tergite piceous with a rather narrow subapical yellow band strongly interrupted medially. The yellow and dark bands on following segments about equal in width, the dark bands having very slight sublateral bulgings anteri-

orly, especially on tergites 3 and 4, and the dark portion at base of tergites 2 and 3 triangularly widened at ends. The dark bands also, except the first, not quite reaching to lateral margins. Legs entirely bright yellow except a fuscous streak on dorsal side of hind tibiæ and except that the last two or three joints of hind tarsi are slightly infuscated. Antennæ yellow, the scape and pedicel beneath concolorous with face, the flagellum beneath a little duller and more brownish yellow. Pedicel and flagellum above fuscous but becoming much paler toward apex. Basal half of labium on axillæ and first joint of labial palpi fuscous, the remaining parts of the labiomaxillary structure yellowish. Tegulæ whitish hyaline with a large yellow spot at base. Wings slightly milky hyaline, the veins very pale brownish yellow, with subcosta, margins of stigma and sometimes veins of marginal cell brown, the stigma otherwise pallid.

Length 4.0 mm.

Type in collection of the Oregon Agricultural Experiment Station, Corvallis, Oregon.

4. PERDITA CROTONIS Cockerell

Three females, Santa Fé, New Mexico, July 22, 1926 (E. C. Van Dyke), in collection of the California Academy of Sciences.

5. **Perdita nigricollis** Timberlake, new species

One female (holotype), Victoria, British Columbia, June 29, 1920 (E. C. Van Dyke).

This runs in Cockerell's table (1896) to *P. affinis* Cress., var. (couplet eighty), but is not closely allied to that species. It differs from *P. affinis* in the shining black disk of mesonotum, spiniform antero-lateral angles of disk of clypeus, head considerably broader than long, etc. It belongs to the group of *P. californica* Cress., and is most similar to another new species from San Diego, California.

Female. General form ordinary. Head considerably wider than long, gently rounded on side and subtransverse above. Cheeks moderately broad. Face below antennæ gently convex. Clypeus projecting moderately in front of ocular line; the disk about one-half broader than high, moderately broadly truncate above between dog-ear plates and with the anterolateral angles strongly spiniform; the lateral extensions very broad, triangularly tapering toward base of mandibles, well inflexed along anterior margin, yet visible to a large degree in frontal view of head. Dog-ear plates hardly longer than wide. Lateral plates of face slightly widened at lower end, and opposite the middle of dog-ear plates, each covering slightly more than one-fourth the total width of face. Prominence between

antennæ rather high and sharply tectiform, with the ridge extending well on to frons and continuous above with a fine impressed median line to anterior ocellus. Frontal foveæ elongate, separated from eye margins by a space nearly equal to their own width, and extending below almost to level of lower margin of antennal sockets. Mandibles moderately stout, gently curved, blunt at apex and reaching to far margin of labrum. (In the type the mandibles are closed so that the inner tooth if present is not visible.) Antennæ ordinary, with the middle joints of flagellum as long as wide. Abdomen oval, about twice as long as wide and gently convex above. Pygidium very narrow and acute at apex. Membrane of wings in apical field with dense but extremely fine and short setæ. Stigma nearly as long as first submarginal cell, moderately narrow and emitting radius slightly beyond the middle. Marginal cell as long as stigma, with the substigmatal and poststigmatal parts about equal and the apical truncation strongly oblique and about two-thirds as long as the metacarpus. Second submarginal cell very broad below, narrowed about two-thirds above, and receiving the recurrent veins a short distance respectively from base and apex, or the first recurrent may be interstitial. Claws tapering from the thickened base, gently curved, simple and very acute at apex.

Frons and vertex strongly tessellate and rather dull, the frons with rather close fine punctures becoming much sparser above, and the vertex behind ocelli with rather numerous fine shallow punctures, which in some aspects appear elongate and sulcate. Cheeks polished, rather closely and very finely punctured, except in a narrow strip along the orbits. Face below antennæ smooth and with sparse, comparatively coarse punctures. Anterior part of mesoscutum finely tessellate and with numerous shallow sulcate punctures. Remainder of mesonotum polished and very sparsely and finely punctured. Thorax otherwise finely tessellate, the mesopleura with rather close fine punctures. Abdomen microscopically lineolato-tessellate and shining. Pubescence short, whitish and mostly erect; moderately dense on cheeks, occiput, punctured part of frons, rather sparser on mesopleura, sparse on face below antennæ and on mesonotum, the disk of latter being nearly bare, but dense and subappressed on mesosternum. Scopa of hind tibiæ sparse and moderately long, the hairs on anterior side of tibiæ somewhat longer and curved.

Head and thorax very dark green, the propodeum bluish, the mesoscutum, except anteriorly, scutellum and metanotum black. Mandibles except reddish piceous tips, most of clypeus, lateral and supraclypeal marks pale yellow. Labrum, anterior margin of clypeus, and two somewhat curved submedian vittæ on disk of clypeus, continuous with dark anterior margin but not quite reaching to dorsal margin, piceous. Lateral face marks large, about as broad as high, strongly rounded toward clypeus and extending along orbits to lower end of frontal foveæ. Supraclypeal mark strongly trans-

verse. Dog-ear plates and prominence between antennæ black. Thorax entirely dark except the pale yellow tubercles. Abdomen piceous, the first tergite with a very slight metallic green luster. Tergites one to five each with a marginal yellow spot on each side, the spots very small on one, two and five, subapical on one, contiguous to posterior end of lateral foveæ on two, and nearly concealed by preceding segment on five, those on three and four much larger but separated by one-half the width of segment and composed of a quadrate portion on the lateral margin at middle of segment and a lobe from inner half of anterior margin of quadrate portion, that projects obliquely forward and mesad to base of segment and is also somewhat curved. Pygidium brownish piceous. Venter entirely dark except the whitish hyaline margins of segments. Legs piceous, a spot at apex of front and middle femora anteriorly, front tibiæ anteriorly, and a streak on anterior side of middle tibiæ yellow, the front tarsi pale brown, and the middle tarsi brownish at apex. Labiomaxillary structure piceous. Antennæ piceous, the apical joint brownish and the flagellum dull brownish yellow beneath. Tegulæ testaceous, subhyaline with a yellow spot at base anteriorly. Wings hyaline, slightly tinted with fuscous, the veins and margins of stigma fuscous, the subcosta piceous, and the stigma otherwise pale.

Length about 5.0 mm.

Type female, No. 2615, Museum California Academy of Sciences.

6. PERDITA ALBIPENNIS Cresson

Three females, collected July 23, 1924, at Mesa, Arizona (E. P. Van Duzee).

A STATE BUTTERFLY

On another page Mr. Gunder tells us of the selection of a state butterfly for California. The motive leading to the selection of a state butterfly was the hope that it may help to arouse a more general interest in the study of entomology and thus to place this branch of zoölogy on a par with certain of the more popular branches such as ornithology and botany. Butterflies are the most beautiful and showy of all insects. They make the strongest appeal to the general public and undoubtedly are most suitable for arousing an interest in, and attracting the attention of the public to the work being done by our entomologists for the public welfare, work that is of the highest importance to the human race but that has only begun to receive the attention it deserves. Any little gesture such as the selection of a state butterfly, insofar as it serves to attract the interest of the public, is well worth while.—E. P. Van Duzee.

MISCELLANEOUS STUDIES IN THE COLEOPTERA, NUMBER ~~THREE~~

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Genus Notoxus

Several years ago Dr. Edwin C. Van Dyke submitted to the writer a small series of a species of *Notoxus*, collected in Inyo County, California. A casual examination indicated that it was an undescribed species. Having been recently arranging and identifying the species in the collection of the California Academy of Sciences, I take the opportunity to describe this new species and to make comparisons with other well-known species.

Notoxus vandykei Blaisdell, n. sp.

Form slightly robust, about two and a third times longer than wide, moderately shining, prothorax notably so. Color more or less piceous; prothorax rufo-piceous beneath, disk nigro-piceous, paler at base and along median third and crest; horn slightly darker, head piceous; palpi and legs rufo-testaceous, femora more or less suffused with piceous; meso- and metasternal regions and abdomen more or less nigropiceous. Elytra rufo-testaceous with a large subquadrate basal scutellar spot, a transverse fascia at apical third which extends rather widely along the suture nearly to the basal spot, gradually and slightly widening anteriorly, lateral transverse and anteriorly lobed spots at about basal third that may attain the lateral margin and the middle of each elytron, black; the black sutural area may be abbreviated or there may be a coalescence between the lateral, sutural and basal spots.

Pubescence pale and somewhat yellowish, brownish to black on the dark areas; recumbent, abundant and moderately fine; on the elytra intermixed with very sparse and nearly erect pale and longer hairs, most noticeable when viewed from the side; on the prothorax the hairs are softer, more or less recumbent, and with scattered long, erect bristling pale hairs; on the disk the erect setæ are blackish, on lateral thirds short, arcuately curved black setæ are observed; on the head the hairs are longer, notably so on the tempora and above the eyes. On the under surface of body the hairs are moderate in length and finer, recumbent and ashy in color.

Head longer than wide and about four-fifths as wide as the prothorax, truncate at base, tempora as long as the eyes, moderately and arcuately convergent to the distinct and obtuse basal angles; front flat between the eyes, sides finely margined, surface closely but not coarsely punctate, punctures separated by a distance equal to one

or two times their diameter, some coalescence is observed; vertex moderately convex, smooth, punctures slightly larger and more widely separated. Eyes rather large, somewhat coarsely faceted, facets individually convex, short interstitial setæ are present; vertical diameter slightly longer than the longitudinal, posterior margin less arcuate. Antennæ moderately slender, long, attaining about the basal fourth of the elytra, feebly incrassate in distal half, joints 2 and 4 equal in length, 3, 5, 6, 7, 8, 9, and 10 quite equal in length.

Prothorax wider than long not including the horn, quite globular; sides strongly arcuate, widest at middle, noticeably convergent toward base and somewhat broadly and slightly sinuate, there obscured by the well-developed latero-basal fimbriæ; basal bead coarse, giving some prominence to the basal angles; basal impressed area narrow at middle broadening laterally; discal basal lobe quite sharply and arcuately defined by the impression; surface polished between the sparsely placed and small punctures which are separated by a distance equal to two to four times their diameter; pubescence transversely directed from each side, meeting in the median line and there more or less backwardly directed; horn moderate in width, rather coarsely crenate, except at apex, three or four crenures each side, scarcely constricted and parallel at base, surface and side of crest with asperities; crest well defined by a raised dentellate margin, the latter best seen from the side, slightly narrowed at apex, surface with small discrete asperities, about two-thirds as long as the horn; margin of the crest and crenate border of the horn, black, the latter very moderately reflexed. Scutellum small and triangular.

Elytra a little more than twice the total length of the prothorax and distinctly wider at base, not strongly convex on the dorsum, markedly so laterally, slightly impressed within the feebly marked humeral umbones; humeri well exposed and quite broadly rounded; sides nearly parallel, slightly divergent posteriorly and feebly arcuate, gradually and arcuately convergent to apex in apical third, apices truncate, truncature very feebly oblique toward the obtusely rounded sutural angles and limited laterally by a small subdentiform salient; surface moderately finely punctate, punctures rather evenly distributed, smaller apically, separated by a distance equal to three or four times their diameter.

Body finely punctate beneath, quite densely so on the abdomen. Legs moderately long.

Male. Elytral apex truncate; last ventral segment feebly arcuately emarginate at middle of apex, adjacent surface somewhat impressed. Anterior tibiæ mutic. Female unknown.

Measurements (types): Length, 3.8 mm.; width, 1.4 mm.

Holotype, male, No. 2616, and seven paratypes, all males, in the collection of the California Academy of Sciences.

Type locality: **Little Cottonwood Creek, Inyo County,**

California. Collected by Dr. E. C. Van Dyke on July 16, 1908, at an elevation of 8000 feet. I take pleasure in naming the species after the discoverer.

For the present *vandykei* may follow *anchora* Hentz in the list of species. The figures given below are to show five types of modification of the elytral apices of the male and the pattern of maculation in each species. The following remarks apply to the males:

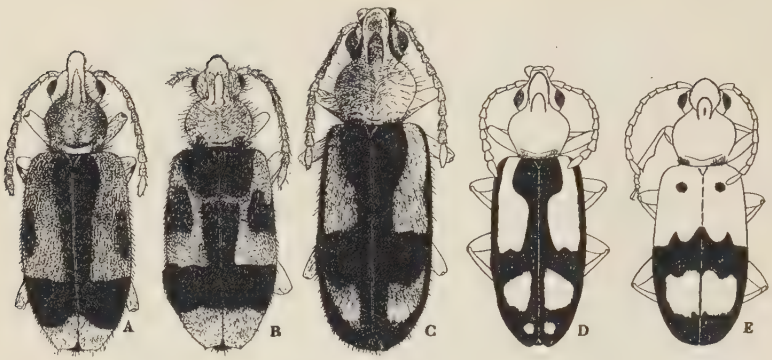
In *vandykei* (fig. B) the elytral apices are truncate and slightly oblique. The pattern of maculation is similar to that of *anchora;* the punctuation is much finer than in that species and sparsely placed erect hairs are distributed over the upper surface. The prothorax is quite globular and its surface is smooth and shining, color more or less piceous.

In *anchora* Hentz (fig. A) the elytral apices are given as being obliquely truncate by Dr. George Horn. The thoracic horn is but slightly wider than the crest, the latter feebly elevated and not very distinctly margined, very poorly defined at apex; the elytral punctuation is moderately coarse and the pronotal surface is rather finely asperate and dull in luster. The recumbent pubescence is intermixed with erect pale hairs, best seen when viewed from the side.

Nuperoides Fall (fig. C) is more elongate and parallel, the elytral pattern of maculation is precisely that of *nuperus* Horn (Fall). The upper surface is sparsely clothed with long, nearly erect, pale hairs and the recumbent pubescence is denser and finer. The head and prothorax are rufo-testaceous. The sutural angles of the elytra are separately rounded and just perceptibly produced, with a feeble external sinuation.

In *nuperus* Horn (fig. D) the elytral apices are separately rounded at apex, pubescence devoid of erect hairs; the last ventral of the male presents a large deep fovea.

Calcaratus Horn (fig. E) has the anterior tibiæ armed with a tooth that is best observed when viewed from the outer side. The prothoracic horn is broad and the margin crenate; the crest has a short median carina. An examination of the figures with a hand lens will prove helpful in recognizing the characters in part mentioned above.



Detailed camera lucida drawings of: (A), Notoxus anchora Hentz; (B), Notoxus vandykei, n. sp.; (C), Notoxus nuperoides Fall; (D), Notoxus nuperus Horn; (E), Notoxus calcaratus Horn. The head of each species is shown in the position it happened to be in at the time of making the drawings. Figures D and E are camera lucida outline drawings.

Genus Diaperis

From other genera of the Tenebrionid Tribe Diaperini the genus Diaperis is characterized by the broadly oval and strongly convex form of body, covered pygidium, emarginate eyes, with the first joint of the metatarsi not longer than the second. Elytra orange-red and maculate.

Diaperis californica Blaisdell, n. sp.

Form narrower, less robust with sides less arcuate, besides being noticeably more parallel than in *maculata* Oliv., maculation similar except that the posthumeral elongate black spot is absent or occasionally represented by an obsolescent dark cloud.

In the male the form is more parallel, the antennæ less robust, dilated joints slightly shorter; the pronotal apical margin is arcuate at middle and not modified, the epistoma is more convex, somewhat concentrically punctured and coarsely punctate at center, but not bituberculate at middle; the front, between the eyes, is broadly and more deeply impressed and rather more strongly punctate on the vertex than in the opposite sex.

The form in the female is slightly more robust and a little more arcuate at the sides; the dilated antennal joints somewhat longer and appear stouter; the eyes are larger and the front is less deeply impressed. Pronotal apical margin arcuate and simple as usual.

Measurements (types): 5-5.8 mm.; width, 3-3.2 mm.

Holotype, male, No. 2617, and allotype, female, No. 2618, and six paratypes in the collection of the California Academy of Sciences, one in the collection of H. C. Fall, Tyngsboro,

Massachusetts. The species should follow *floridana* Blatch. in our lists.

Type locality: **Davis Meadow,** near **Railroad Flat, Calaveras County, California.** Collected on July 8 at an elevation of 2800 feet, taken from a large fungus on a dead white oak. Nine specimens studied.

Distribution. Besides the type locality, specimens have been taken at Chiquito Creek, Madera County, California, by Henry Dietrich of Lucedale, Mississippi; Placer County California, by E. C. Van Dyke. All collected in California.

The following synoptic statement may be given at the present time:

Mesepimera very sparsely punctate; elytra bifasciate; prothoracic apical margin arcuate and entire at middle, adjacent discal surface feebly and rather broadly impressed in median line; second antennal joint distinctly constricted in basal half, apical portion slightly swollen; prosternal process subhorizontal and submucronate at apex. Europe.....*boleti* Linn.

Mesepimera densely punctate 1

1. Prothoracic apical margin emarginate at middle and impressed on the discal surface at that point in the male..... 2

Prothoracic apical margin entire and arcuate at middle in both sexes; prosternal process arcuate..... 3

2. Elytra maculate, an elongate black spot behind the humeri, large macule at apical third not uniting with sutural black stripe; epistoma feebly bituberculate at middle in the male. Eastern United States and Mexico. (Syn. *hydractina* Fab., *suturalis* Chev. and *hydni* Fab.).....*maculata* Oliv.

Elytra fasciate across apical third, posthumeral elongate black spot absent. Florida .....*floridana* Blatch.

3. Elytra bifasciate; strial punctures of elytra coarse and strong; second antennal joint feebly constricted in basal half, slightly swollen apically; pronotal disk at apex behind margin very feebly and broadly impressed on median line in the male. Lower California, Southeastern California, Arizona.....*rufipes* Horn.

Elytra maculate as in *maculata,* posthumeral elongate black spot absent or obsolescent; form less robust and more parallel; second antennal joint almost evenly obconical; pronotal disk not visibly impressed on the median line in the male. Central California.....*californica* n. sp.

The degree of rufous coloration of the head and appendages is very variable and often there is a reddish tinge to the pronotal disk. The European species *boleti* Linn. has been intro-

duced for comparison and contrast, as specimens at hand have the genital organs protruded which serve as a criterion for the comparative determination of the secondary characters that are not well marked in the American species, least in *californica*.

Note on Genus Clastoptera

Volume XVIII, Number 1, of the University of Kansas Science Bulletin contains a monographic paper on the Homopterous genus Clastoptera by Miss K. C. Doering. In this paper she recognizes thirty distinct species and five varieties. I have not yet had an opportunity to make any adequate test of this work, but my first impression is that she has made too many species, as some of her new forms are certainly very close to others. She has recognized no subspecies and undoubtedly further studies will show that many of her so-called new species are really subspecies of others. On the other hand, some of her recognized varieties seem to be true subspecies or geographic races. A subspecies occupies either a distinct geographical or a distinct ecological area and never exists independently in company with the parent species. A variety is merely a color phase or a mendelian unit that may develop within any brood of the parent species. Where a "variety" persists independently in company with the parent species but does not mix, it undoubtedly should be placed as a distinct species.

I cannot subscribe to the custom, now quite prevalent in this country, of placing a species as a "variety" of itself, as we see in this paper by Miss Doering. "*Clastoptera obtusa* var. *obtusa*" and "*Clastoptera proteus* var. *proteus*" are examples. The forms so placed are not varieties at all but they are the type species. A variety is a variation from the normal of the species and the type form cannot be a variation of itself. The case is decidedly different when we divide a species up into subspecies the typical form of which must bear the name of the species. In this case we use trinomials, repeating the name of the species for the typical form. It is a disputed question whether we should give names to mendelian or color forms that may crop out in any brood. Seasonal races seem to stand with geographical races, and for those a trinomial is convenient.—E. P. Van Duzee.

THE "COFFEE-POT" COCOON AND THE INSECT THAT MAKES IT

BY A. L. PICKENS

Because of the neatly hinged lid and the spout-like protuberance in front, the cocoon of *Megalopyge crispata,* or *Lagao crispata* as it is sometimes called, has won, among inhabitants of the Carolina foothills, the name of "Coffee-pot." These are found chiefly on, or in close proximity to, oak trees, especially on the twigs of the narrow-leafed water oak, which on account of rapid growth is much used for shades on lawns and streets in the southern hill towns. Popular knowledge of the species and its allies, however, extends no further than a bare acquaintance with the cocoons.

Investigations extending over a period of years, chiefly in the upper and middle regions of the Savannah River Valley, brought to me opportunity to observe eggs, larvæ, and adults of the "Coffee-pot" maker.

The caterpillar is very woolly, with the hairs on the sides of the body a dull gray, while a scalloped crest along the mid-dorsal line is of a rich brown shade. Just below the middle of the crest, on each side of the caterpillar's body, is a series of three white tufts of hair contrasting with the surrounding gray, while the rear of the body terminates in a tassel-like tail of brown hair. If the hair of the body be parted, a surprisingly smooth and light-colored skin is visible.

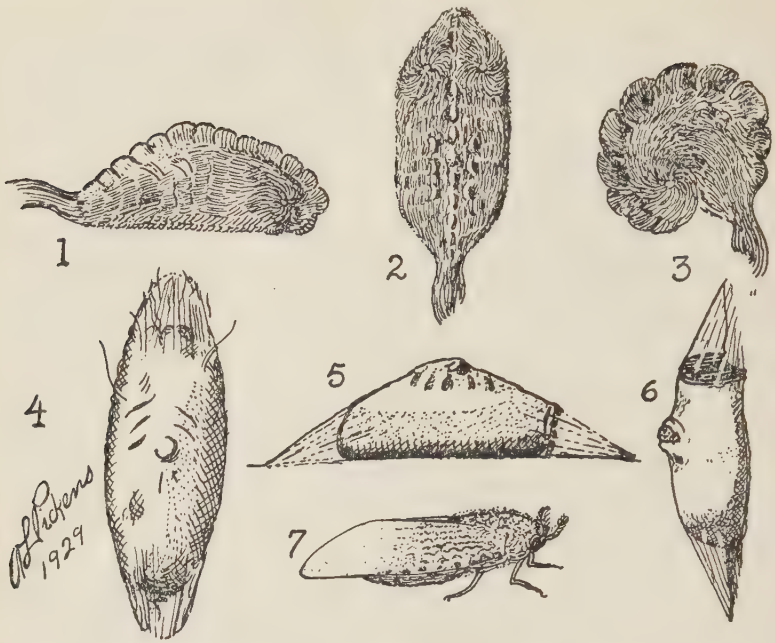
When the larva is irritated it draws up into a knot, somewhat like a hedgehog, tucking the head back under the ventral regions, and sticking the tail out in a very conspicuous manner, as shown in the sketch at No. 3. In addition to this protective action it resorts to the offensive by emitting a very strong and unpleasant odor, resembling that of the shucks of Indian corn that have been piled on damp earth until decay has set in. They are apparently very well formed for concealment, and are much harder to find than are the cocoons which contain them later. These cocoons are found sometimes on planks, beams or other timbers on the outside of buildings, again on the trunks of broad-leaved oaks, or even blackberry vines but, as previously indicated, are most successfully sought on the twigs of the

water oak. Different individuals build the pupating chamber in different positions. Some are placed vertically with the lid at the top; some are fastened against a wall horizontally with the spout and lid in horizontal relations; others, placed on the lower side of twigs, swing down at an angle, the lid nearer the ground below the levels of the spout and the base.

The cocoon is constructed in the autumn, at the time when many other larvæ of moths are preparing for the winter pupation period. First, without shedding the thick growth of hair, the insect covers its whole body with a spindle-shaped cocoon of silk so thin that the body within is plainly visible, with the skin revealed through the tightly compressed bunches of hair, for so close-fitting is this covering that one wonders how the insect manages to shape the remarkable parts of its habitation. For several days the work goes on, the covering still soft and yielding to the touch, and when disturbed the insect within still emits the offensive sour shuck-like odor. Gradually the walls become thicker, and the restricted space within is still further limited by the larva cutting off each end of the silken spindle. A sagittal section of the cocoon at this period would resemble an elongated capital D cut off at the top by a straight line, and at the bottom by a thin half-crescent. Gradually a peculiar wrinkle begins to show at the middle of the cocoon. As the work goes on we catch sight of part of the hair from the body of the larva sticking up here, and at last the wrinkle becomes so elevated and elaborated that we have a reasonable imitation of a bud, evidently developed for deceiving such birds as penetrate into smooth and conspicuous cocoons for the sake of the pupating insects inside. It is probable that the scalloped crest of the larva is of value in pressing and moulding this part of the pupal chamber into form, and a part of the woolly coat is evidently crammed into it from within. The walls have now grown so thick that the inmate can no longer be seen; but inside, judging from cocoons that have been opened, most of the hair has been discarded, though now and then an individual may cling for some time to its woolly covering, probably to tuck it and the cast skin, later, into the bottom of the cocoon on assuming the pupal form. About two weeks' time is required to complete the habitation. The door at the upper

part of the cocoon is the most remarkable part of the whole structure. It is a partial disk, made up apparently of several layers of silk with the curved edge as smoothly cut as if done with a cobbler's knife, the whole so hinged at the back that it can be opened and closed repeatedly without coming off, although the inmate makes use of the hinge but once in its life! What is more, this structure, so distinctly apart from the rest of the cocoon, is made along with the cocoon and sealed to it all about the edges until the time, perhaps as late as the following June, comes for the moth to emerge. Then the glue-like seal is loosened about the curved edge of the lid, the insect inside pushes against the door which swings outward. Another push, and the head of the moth, still covered with the pupal skin, is partially out. The struggle continues until the pupal covering is quite outside, whereupon the adult wriggles out of the dried skin, the rear part of which is caught by the door that, with a great deal of springiness, attempts to snap back into position once the pressure from the inside is withdrawn. Thus the lid, in addition to being a door-shutter is also something of an automatic undresser, and helps strip off the pupal covering, so permitting the moth to go on its way unimpeded. If not already blown away by the wind the loose silk at each end is eventually so disposed of, leaving the cocoons as usually found.

The adult is not an attractive moth; there is little of the beautiful, and less of the conspicuous in its make-up. It is dark-tinged, with brown and heavily shaded cream blending modestly in its markings, and near the fore part of the wings the long furry scales are crinkled and waved into a graceful series of convolutions that drop off all too easily, leaving the insect ragged and drabbled in appearance. It possesses, let it be remarked in passing, what has been designated in Kellog's "American Insects" as true hair, that is, scales so elongated and fine as to have passed from the scale stage into that of hair. This may account for the gracefully waved covering of the fore part of the wings. Whether or not it is an instinctive plan of the insect to warm and protect its eggs, I cannot say, but in my experiments I have found the eggs deposited in a mass, with the hair-like scales placed carefully about them as



if to form a rude nest. It is possible that these, carefully placed as a first impression might make them seem, were not the result of an unusually gentle maternal instinct, but of accidental pulling off during the process of attaching the eggs with the gluey secretion that held them in place. Unfortunately, however, I have not seen this, an important stage in the life cycle of the insect, except after actual deposit by the mother, and cannot speak with sufficient authority as to the care bestowed on the eggs.

A Correction

In The Pan Pacific Entomologist of July, 1929, p. 22, I gave the type locality of *Blapstinus falli* as Naples, Santa Barbara County, California. I have been informed by Prof. H. C. Fall and Mr. J. O. Martin that it should have been Naples, Los Angeles County, California. This latter locality is near and south of Long Beach. Regarding the former, Naples, Santa Barbara County, is the second railroad station north of Santa Barbara. The duplication of names is the cause of the error, as the county was not given on the locality label.—Frank E. Blaisdell, Sr.

NEW TERMITE RECORDS FOR LOWER CALIFORNIA

BY S. F. LIGHT

Banks and Snyder, in their "Revision of Nearctic Termites" (1920), mention but two termites from Lower California, *Kalotermes hubbardi* Banks (Cape San Lucas) and *Kalotermes occidentis* Walker (Angel de la Guardia Island and Cape San Lucas).

Through the kindness of Professor J. Grinnell, director of the Museum of Vertebrate Zoölogy of the University of California, and Mr. Chester C. Lamb, collector of the Museum, I have received for study three lots of termites collected by Mr. Lamb during the years 1926-1928.

These collections, small as they are, have added very materially to our knowledge of termite distribution, extending the known southern range of several species by many hundreds of miles, and serve to give some earnest of the interesting finds awaiting the termite collector in this region. I give below a list of the six species contained in these collections with localities, dates of collection and location of colonies, and, following the list, a discussion of the known range of each species.

1. *Termopsis nevadensis* Hagen. June 19, 1926, Vallecitos, San Pedro Martir Mountains (about 150 miles south of the border), 7500 feet, in rotten stump of Jeffrey Pine, all castes.
2. *Kalotermes occidentis* Walker. June 1, 1927, Santo Domingo Landing (on west coast about 400 miles south of the border), in Yucca, nymphs only; December 1928, La Paz (on east coast about 150 miles from tip of peninsula), from a Palo Verde stump, soldiers and nymphs.
3. *Kalotermes minor* Hagen. May 26, 1926, El Cajon Canyon, east base of San Pedro Martir Mountains (about 150 miles south of border), 3200 feet, "in partially dead willow stump," all castes; same locality and date, "in limb of willow," soldiers and nymphs.
4. *Kalotermes hubbardi* Banks. October 16, 1928, Todos

Santos (on west coast about 60 miles from tip of peninsula), two dealates, "crawling on work table at night."

5. *Neotermes simplicicornis* Banks, April 5, 1926, San Felipe Bay (130 miles south of Mexicali), "in dead mesquite stump," soldiers and nymphs.
6. *Reticulitermes tibialis* Banks. December 6, 1928, El Sauce, Victoria Mountains (at tip of peninsula), 4000 feet, in fallen oak limb, soldiers and workers.

It will be noted that we have here, as representatives of the termite fauna of Lower California, six species all of which occur in the nearctic region, several of which range into northern California, one as far north as Vancouver Island and another into Montana, and that no tropical species have been collected so far.

Termopsis nevadensis Hagen

The two coast species of *Termopsis, T. angusticollis* Hagen and *T. nevadensis* Hagen, have been distinguished (Banks and Snyder, 1920) on the basis of size and color difference between the alates. Color differences fail in incompletely pigmented individuals from nest series. Size differences, therefore, have been largely depended upon for diagnosing the two species. Study of large series shows that the size range for *T. angusticollis* must be revised downward and that for *T. nevadensis* upward, and hence many earlier determinations are in doubt. The alates collected by Mr. Lamb have been somewhat of a puzzle, lacking the dark pigmentation characteristic of *T. nevadensis* and ranging in size as they do into the lower limits for *T. angusticollis*. Unpublished studies by Mr. G. B. Castle and Miss Ethel Craig seem to present satisfactory criteria for differentiating the soldiers and the numphs of these two species. On the basis, therefore, of head shape and other characters of the alates and of the characters of the single soldier included in the collection and the characters of the nymphs, I feel justified in diagnosing this collection as *T. nevadensis*.

Previous to this report, Los Angeles stood as the southernmost reported locality for *T. angusticollis* and Monterey for *T. nevadensis*. Recent collections made by Mr. G. Edward

Chase of San Diego have shown *T. angusticollis* to occur near sea level at San Diego, and collections by the Termite Investigations Committee show it to occur in the southern mountain ranges. With its northernmost limits in British Columbia, and its present known southern limit in San Diego, this species has a known north and south range of at least 1150 miles. Monterey was the southernmost collection point for *T. nevadensis* until this collection of Mr. Lamb's pushed its range limits 400 miles to the south, giving it a north and south range of about 1250 miles from Vancouver Island in the north to the San Pedro Martir Mountains of Lower California in the south.

Kalotermes occidentis Walker

Kalotermes occidentis Walker is a remarkable species, much larger than any other species of the genus *Kalotermes,* to which it has been reassigned by Banks (1920). The soldiers all have remarkably well-developed wing pads, and on this basis Holmgren (1911) placed it in a new genus *Pterotermes*. The nymphs also differ in the possession of small but pigmented compound eyes from an early stage. Furthermore, unpublished studies by Mr. W. W. Lewis, made possible by material collected by Mr. Lamb, show that one of the Protozoa of its intestinal fauna belongs to a genus which has not yet been found in a species of *Kalotermes* s. st., but is found in the species of the genus *Cryptotermes*. For these reasons it seems possible that a careful study of its morphology may show it not to belong to *Kalotermes* s. st.

This very interesting species was reported by Banks and Snyder (1920) from Sabino Canyon, the Coyote Mountains and the Baboquivari Mountains in Arizona, from Angel de la Guardia Island in the Gulf of California and from Cape San Lucas at the tip of Lower California. The records from Coyote Mountain and Baboquivari Mountains are not definite, however, since they are based on winged adults which from their size Banks believed to belong to this species, but which were taken flying and hence cannot be allocated to this species with certainty. Material collected from near Douglas, Arizona, by Professors A. A. Nichols and C. T. Vorhies of the University of Arizona, gives another locality for that state. Mr.

Lamb's two collections widen the known range in Lower California.

KALOTERMES MINOR Hagen

Kalotermes minor Hagen was reported by Banks and Snyder (1920) from Niles in Alameda County, from San José and from Monterey County, from Los Angeles and from Palm Springs, Riverside County, in California, and from southeastern Arizona (Pima County). Collections made by me in May 1925 and reported by Snyder (1926) add Copper Butte Canyon near Ray, Arizona, and Prescott, Arizona, as localities for this species, and more recent collections show it to be present in Ash Fork. The collections of the Termite Investigations Committee have shown this species to be common along the Pacific Coast as far north as Westport in Mendocino County. The northernmost known extension of its range is marked by a single collection (Harvey) from Redding, in Shasta County. It is not known to occur in the central San Joaquin Valley, but reappears again around Bakersfield and in the Tehachapi, the San Bernardino Mountains, and other southern mountains. In the Mohave Desert Barstow marks the eastern limit of its range, and in the Colorado Desert Garnet and Palm Springs. Its range is evidently continuous into Arizona, either south through Mexico or north through Nevada. The present collection extends the recorded range of this important economic species about 150 miles to the south, giving it a known north to south range of about 750 miles.

KALOTERMES HUBBARDI Banks

Kalotermes hubbardi was previously reported by Banks and Snyder (1920) from Cape San Lucas. A dealate pair of this species was taken by Mr. Lamb, crawling on his work desk at Todos Santos, on the west coast of Lower California. It has been reported in California (Banks and Snyder, 1920) from San Diego and as far north as San José. Careful search on the part of the Termite Investigations Committee has failed to show its presence in the state save at Blythe on the Colorado River. It is widespread throughout southern and central Arizona and presumably through much of Lower California and the western portion of Mexico proper.

Neotermes simplicicornis Banks

Neotermes simplicicornis Banks (1920) was known from a single collection by Snyder made in southeastern Texas. No winged forms were taken and Banks placed the species in the genus *Kalotermes*. This species was taken later in Sabino Canyon in southeastern Arizona, and in 1925 I took it at Ray, in Central Arizona (Snyder, 1926; Light, 1926, 1927). In 1927 the species was collected by the Southern Pacific Railway Company near Indio, Riverside County, California, and again in 1928, at the request of the Termite Investigations Committee, a considerable collection was brought in by Mr. R. M. Alpen from the same locality which contained two alates, not previously known. These showed it to belong to the genus *Neotermes*. Since that time it has been taken in connection with the field investigations of the Termite Investigations Committee (Light, Pickens, Harvey) from the Colorado and Mohave deserts and western Arizona. Its western limits in the deserts have been located at Barstow in the Mohave and Garnet and Palm Springs in the Colorado. In Arizona its known distribution is widened by my collections at Topac and Yucca and near Roosevelt Dam. Mr. Lamb's collection locates it on the western shore of Lower California, about 130 miles south of Mexicali, thus considerably extending the known southern limits of the range of this interesting and economically important species.

Reticulitermes tibialis

Reticulitermes tibialis was already known to range from Iowa to the Pacific Coast and from western Montana to central Riverside County in California. Its collection by Mr. Lamb at the tip of Lower California adds about 750 miles to its north-south range, bringing it to the amazing total of about 1650 miles. This would seem also to represent the most southerly record for the genus *Reticulitermes,* which is typically holarctic.

Literature Cited

Banks, N., and Snyder, T. E.
1920. A revision of the Nearctic Termites (Banks) with notes

on their biology and geographical distribution (Snyder). Bull. U. S. Nat. Mus., 108: 1-228, pls. 1-35, 70 figs. in text.

Grinnell, J.
1928. A distributional summation of the ornithology of Lower California. Univ. Calif. Pub. Zool., 32: 1-300, 24 figs. in text.

Holmgren, N.
1911. Termitenstudien. 2. Systematik der Termiten. K. Svensk. Vet. Akad. Handl., 46: 1-88, pls. 1-6.

Light, S. F.
1926. On *Hoplonympha natator* gen. nov., sp. nov., Univ. Calif. Pub. Zool., 29: 123-139, 28 figs. in text.

Light, S. F.
1927. *Kofoidia,* a new flagellate from a California termite. Ibid. 29: 467-492, pls. 23-24, 8 figs. in text.

Snyder, T. E.
1926. Notes on termites from Arizona. Ibid. 28: 389-397, 6 figs. in text.

A NEW OLIARUS

BY E. P. VAN DUZEE

Oliarus truncatus Van Duzee, n. sp.

Closely allied to *aridus* and *californicus* but with broader costal areole, the narrow vertex of *californicus* and different male genitalia. Length, 6-6.5 mm.

Male. Vertex slightly narrower and more parallel-sided than in *californicus*; costal areole one-half wider than the adjoining areole, in the allied species these areoles are subequal in width; stigma as in *aridus,* larger and darker than in *californicus*; elytral veins feebly punctate; front as in *aridus,* the pale lateral spots smaller; rostrum exceeding hind coxæ by two-thirds the length of its last segment. Male pygofers shaped as in *californicus* but shorter with the apical margins of the sides truncate, the median notch broad and shallow; plates exceeding the pygofers by half their length, their apical margin truncately rounded, their inner angle subacute; their apical member shaped much as in *aridus* but shorter and transverse, not as produced medially.

Described from the type and six male paratypes, three taken by the writer at La Jolla, California, January 27, 1913, and three taken by Mr. W. S. Wright at San Diego, California, August 21, 1913.

Holotype, male, No. 2622, Mus. Calif. Acad. Sci., collected by E. P. Van Duzee, July 4, 1913, at **Alpine, San Diego County, California.**

CONCERNING TWO OF GUÉRIN-MENEVILLE'S TYPES IN THE NATIONAL MUSEUM OF PARIS (HEMIPTERA: NOTONECTIDÆ AND CORIXIDÆ)

BY H. B. HUNGERFORD
University of Kansas, Lawrence

Dr. G. W. Kirkaldy and J. R. de la Torre-Bueno, in their "Catalogue of American Aquatic and Semi-aquatic Hemiptera," 1909, gave the following insufficient reference: *"Notonecta unifasciata* Guérin 1857, le Moniteur, p. (?)," and placed the species as a synonym of *Notonecta indica* L. They omitted *Corixa femorata* Guérin, which was described in the same paper with *Notonecta unifasciata* Guérin.

Champion placed *Corixa femorata* Guérin as a synonym of *Corixa abdominalis* Say, which is an entirely different species. Nevertheless it remained thus submerged until I chanced to find some specimens from Mexico which I thought must be Guérin-Meneville's unknown species and so described and figured them ("Bulletin of the Brooklyn Entomological Society," Vol. 20, No. 1, plate 1, February 1925).

The *Notonecta unifasciata* Guérin reference, as given in the catalogue, I was unable to complete until I found it in Paris upon my first visit to the entomological collections in the National Museum. I came across a box bearing the obscure label "Hautlé." In it was the display prepared by Guérin-Meneville dealing with the use of water bugs as food in Mexico and doubtless used by him in his report before the Academy of Sciences. The box contains the following:

1. Six pieces of reed covered with eggs, two of the pieces a foot or more in length.

2. A spoonful of eggs in a container devised by sealing together with red wax two watch glasses.

3. Two examples of "Calcaires oölithiques"—one from Mexico (gray in color) and one from France (chalk white).

4. Six pinned specimens of *Corixa femorata* Guér. (four males and two females) (two labeled types) and four or five more in glass vial.

5. Ten pinned specimens of *Corixa mercenaria* Say and a vial full besides.

6. Eight pinned *Notonecta unifasciata* Guér. (two marked "type") and a vial containing nineteen specimens (10 ♂ ♂, 6 ♀ ♀, 3 nymphs). The written labels pinned in the box are as follows:

1. "Mémoire sur trois spèces d'insectes hémipteres du groupe du punaises aquatiques, dont les Oeufs servant à faire une Sorte de Pain nommé Hautlé au Mexique. Par M. F. E. Guérin-Meneville."

2. "*Corixa femorata* Guér. *Corixa mercenaria* Say, dont les oeufs constituent une sorte de farine au Mexique."

3. "Ahautlé *Corixa femorata* Guérin-Meneville. Acad. du Sciences. Séance du 23 Nov.[1] 1857. Rev. et Mag. de Zool., 1857, p. 523. L'Illustration, 17 Juillet 1858, p. 47, avec figures dans le texte."

4. "Fragments de Jonce couverts du Oeufs des deux espèces de Corixa et de la Notonecta."

5. "Farine du Mexique—Oeufs de Corixa." (In the watch glass case.)

6. "Calcaires oölithiques. Le gris du Mexique. Le blanc de France."

Thus with the complete references mentioned I was able to examine the articles in the National Library at Paris. Since the publications are not accessible to most of us I am submitting some notes that give information concerning the insects and enable us to complete our bibliographical references.

This report concerning the use of the water bugs as food by the Mexicans must have been deemed a very important one, for it was published almost word for word in several periodicals.

I. "Le Moniteur Universel"—Journal officiel de l'Empire Français, Numéro 330, p. 1298, 26 Novembre 1857. This is the completed reference for the partial one given in Kirkaldy and Bueno's Catalogue relating to *Notonecta unifasciata* Guérin. "Le Moniteur Universel . . . " is a four-page news sheet about sixteen and one-half inches wide and twenty-five inches long, and set up in five rather large columns. The title of the paper in which we are interested is given "Entomologie appliquée Hautlé-Pain D'Insectes."

"Extrait d'un mémoire de M. Guérin-Meneville sur trois espèces d'insectes dont les oeufs servant à faire une sorte de pain nommé Hautlé au Mexique."

[1] Nov. (?) The writing of this abbreviation is difficult to decipher.

Then follows the article which is identical with that appearing in "Revue et Magasin de Zoologie," Tome IX, 1857.

II. "Revue et Magasin de Zoologie," 2nd ser., Tome IX, pp. 522-527, 1857, Paris.

"Séance de 23 Novembre 1847—M. Virlet d'Aoust lit une Note sur des oeufs d'Insectes servant à l'alimentation de l'homme et donnant lieu à la formation d'oolithes dans des calcaires lacustres du Mexique."

In this article is given a review of past literature, the story of the use of the insects and their eggs as food in Mexico, description of the eggs and of *Corixa femorata* and of *Notonecta unifasciata*. Concerning the eggs of the two Corixids, *C. femorata* and *C. mercenaria* Say, he says, "Ils sont de forme ovalaire, avec un petit bouton au bout et un pédicule à l'autre extrémité, au moyen duquel ils sont fixés sur un petit disque arrondi que la mère colle à la feuille. Parmi ces oeufs, qui sont très rapprochés et quelque-fois fixés l'un sur l'autre, comme on le voit dans une des figures de mes dessins, on en observe d'autres considérablement plus grands, allongés et de forme cylindrique, collés sur le flanc contre ces mêmes feuilles de joncs, et qu'appartiennent à un autre Insecte plus grand, à une véritable Notonecte très voisine des *Notonecta americana* et *variabilis* des auteurs." Then follows what we must accept as his description of *Notonecta unifasciata*: "Cependant, comme elle offre des caractères qui la distinguent de ces espèces, Je la décris et représente comme une espèce nouvelle que j'appellerai *Notonecta unifasciata,* à cause de la large bande transversale blanche du milieu de son corps en dessus."

It is fortunate that the types are preserved. His new *Corixa femorata* receives the following attention. I have not found a fuller description, but illustrations that are unmistakable appear elsewhere. "Les principaux fabricants de cette farine animale du Mexique sont deux espèces du genre *Corise* de Geoffroy, hemiptères de la tribu des Notonectides, dans la famille des Hydrocorises, ou Punaises d'eau, genre qui compte plus de soixante-dix espèces très difficiles à distinguer entre elles par des caractères extérieurs. La premiere forme une espèce nouvelle, bien distincte par les cuisses antérieures des males qui sont très épaisses, ainsi que par d'autres caractères mentionnés

dans le description détaillée que j'en donne et dans les figures qui accompagnent mon Mémoire. Je lui ai donné le nom de *Corixa femorata.* La Seconde a été déscrite d'après des individus achetés au marché de Mexico et publiée en 1831 par Thomas Say, entomologiste americain, sous le nom de *Corixa mercenaria."*

Even without the types the drawings given in the article below would suffice.

III. "L'Illustration," Tome XXXII, Juillet 17, 1858. In this illustrated magazine, on page 47 of the above number, is a small woodcut block of drawings illustrating a dorsal view of a male, front leg of the male, two eggs, one attached to the other, and a piece of Juncus with three Notonecta eggs and forty-eight Corixid eggs, the latter on stalks. These stalked eggs are interesting and correctly drawn, for I compared the drawings with the original material. The stalked eggs remind one of the eggs of Cymatia. (*See* "Bulletin Brooklyn Entomological Society," Vol. 18, No. 1, page 13, 1923.)

The drawings given here are tracings from those published in the above magazine. The article is almost word for word the same as appeared in the "Revue et Magasin de Zoologie."

The title under which the paper appears is "Pain d'Insectes, Nommé Ahautlé au Mexique." Fait avec une farine composé d'oeufs de punaises aquatiques. The article is signed Guerin-Meneville at the end.

IV. "Annals and Magazine of Natural History," Ser. 3, Vol. 1, pp. 79-80, 1858. This is an English review that mentions the oölites in Mexico and the gathering of Hautlé by the Mexican Indians and is credited to Comptes Rendus, November 23, 1857, p. 865.

V. "Bulletin Soc. Zool. Acclim.," Vol. IV, p. 581, 1857. This is the reference given by Champion in his reference to *C. femorata* Guér., which he made a synoynm of *C. abdominalis*

Say. The account is almost identical with the one in the "Revue et Magasin de Zoologie." It lacks, however, the first paragraph and adds two short ones at the end. In one of Doctor Kirkaldy's unpublished notes, which is bound in R 2 of his set of separates which we purchased some years ago, I find his notation: "The November number of the Rev. et Mag. did not appear before Dec. 6th (v. p. 529)." It was Doctor Kirkaldy's opinion that the "Moniteur," November 25, 1857, was the first one to appear.

VI. "Bulletin Soc. Ent. Fr." (3) V. p. CXLVIII-CLI. Here also is a repetition of the story that was certainly preceded by the "Moniteur."

A Catalogue of the Mesoveliidæ

Fascicle II of the General Catalogue of the Hemiptera, which has just come to hand, records the small family Mesoveliidæ. It has been prepared by our old friend Dr. Geza Horvath, who, since the death of Dr. Reuter, has been easily the leading hemipterist of the world. In this catalogue Dr. Horvath enumerates two genera and fourteen species now described. Three of these are Palæarctic, five Indo-Australian, and six American. Of the latter, three have been recorded from north of Mexico. It may be noted that *Mesovelia bisignata* Uhler has come back, and is now considered as distinct from *mulsanti* White.

In the preparation of my catalogue of the Hemiptera of America North of Mexico, I followed Dr. Reuter's classification of 1912 and placed this family just before the Nabidæ, but through the kindness of Dr. Bergroth was able, in a footnote, to indicate its true position in the superfamily Gerroidea, where Dr. Horvath had placed it *in lit.* In his present catalogue he gives it the same position.

Fascicle I of this great catalogue, the Membracidæ by Prof. Funkhauser, was noticed in The Pan-Pacific Entomologist, Vol. IV, page 40, 1927. We understand the preparation of certain other families is well under way. They will be most welcome when they do appear.—E. P. Van Duzee.

THE COLEOPTERA OF UTAH—CICINDELIDÆ[1]

BY VASCO M. TANNER

This paper is the first of a series in which the writer proposes to deal with the Coleoptera fauna of Utah and portions of the Great Basin. Many of our noted coleopterists have collected in various parts of this region, but very little has been published on their findings. It is the purpose of these papers to bring together what is known and make additions from my collection which has been obtained from all parts of the state.

I wish to thank Dr. Frank E. Blaisdell, Sr.; Mr. L. L. Buchanan, Mr. Warren Knaus, Dr. Walther Horn, and Professor H. E. Wickham for notes on Utah collections and expressions of opinion concerning certain species.

CICINDELIDÆ

1. Amblycheila schwarzi W. H.

Bellevue, Washington County, 1917 (Engelhardt and Doll).

In my correspondence with Mr. Warren Knaus he informs me that two specimens of this species were found dead in a pool in Ash Creek near Bellevue, Utah, by Mr. George P. Engelhardt and Mr. Jacob Doll in 1917. I have collected at various seasons of the year for several years in this region, but have not found this species. It seems to be very rare.

2. Cicindela purpurea var. auduboni Lec.

Great Salt Lake Valley, 1850 (Captain Howard Stansbury); City Creek Canyon near Salt Lake City, March and June (John Sugden and G. W. Browning).

The first insects taken in Utah for scientific purposes were collected by Captain Stansbury and his party during the years 1849-50. The poor means of caring for and transporting collections made it almost impossible to get large collections back to the eastern centers of study. Professor S. S. Haldeman, who studied the Stansbury collection, reported eleven species of insects from Utah, six of which were Coleoptera.

3. Cicindela purpurea var. graminea Schp.

Provo, April, 1915, 1928, 1929; Indianola, May, 1927 (Vasco M. Tanner); Salt Lake City, June, 1915 (John Sugden); Lava Hot Springs, Idaho, May, 1928 (D. E. Beck).

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[1] Contribution No. 19 from the Department of Zoölogy and Entomology, Brigham Young University, Provo, Utah.

4. CICINDELA PURPUREA var. NIGERRIMA Leng

City Creek Canyon, Salt Lake City, April and August (Browning and Sugden).

Professor H. E. Wickham informs me that he has specimens of this species which were taken by Mr. Browning in April.

5. CICINDELA CIMARRONA Lec.

Logan, April, 1915 (Harold Hagen and Herbert Pack); Wellsville, June, 1926 (Tanner).

6. CICINDELA REPANDA Dej.

Great Salt Lake Basin, 1871 (Hayden Survey); Douglass, Dinosaur Quarry, July, 1926 (Tanner); Duchesne, July, 1926 (Tanner and C. J. D. Brown); Green River, June, 1927 (Tanner and J. Kartchner); Moab, June, 1927 (Tanner and Anson Call, Jr.).

This species was reported from the Great Salt Lake Basin by Dr. George H. Horn in the United States Geological Survey of Montana and Adjacent Territory, 1871 (1872), pp. 382-392. Mr. Cyrus Thomas and other members of the Hayden party collected the beetles of this report between June 1 and July 6, 1891: "Starting from Ogden, Utah, through the Salt Lake Basin, by way of Brigham City, Boxelder Creek, Copenhagen, and Cache Valley; thence out of the Salt Lake Basin to Port Neuf River and Port Hall." Mr. E. T. Cresson, Jr., of the Academy of Natural Sciences of Philadelphia informs me that there is one specimen of *repanda* from Utah in the Horn collection.

Dr. Horn reports the following species as being widely distributed over the territory studied: *C. 12-guttata* Dej., *C. purpurea* Oliv., *C. punctulata* Fab. and *C. tranquebarica* Hbst. (*vulgaris* Say). There must be some mistake about *C. 12-guttata* Dej., as it was no doubt taken in the eastern part of the territory, probably Kansas.

Mr. J. D. Putnam (Davenport Acad. of Sci., Vol. 1, 1876, pp. 199-204), lists the Coleoptera collected in the vicinity of Spring Lake Villa, six miles south of Payson, Utah. The following Cicindelids were reported: *C. 12-guttata* Dej., *C. senilis* Horn, *C. tranquebarica* Herbst. and *C.* near *purpurea* Oliv. *Cicindela senilis* Horn may be confused with *C. echo* Csy.

The twenty-one Utah specimens of this species in my collection are all more coppery in luster and have broader macula-

tions than any of my eastern specimens. Dr. Blaisdell has a series of *repanda* which he collected at Baltimore, Maryland, which shows a wide variation with respect to the maculations; some of them are three times as wide as others.

7. CICINDELA HIRTICOLLIS Say

Moab, June, 1927 (Tanner and Irvin Rasmussen); St. George, March to November, 1917, 1921, 1922 (Tanner); Mesquite, Nevada, May, 1922 (Tanner).

This species is abundant on the muddy flood plains of the Virgin River and the Santa Clara Creek, near St. George.

8. CICINDELA TRANQUEBARICA Hbst.

St. George, June, 1919 (Knaus); April, 1922 (Tanner); Zion National Park, June, 1919 (Knaus); June, 1929 (Tanner).

9. CICINDELA TRANQUEBARICA LASSENICA Csy.

City Creek Canyon, near Salt Lake City, 1928 (G. Rasmussen).

This is a distinctive form and a new record for Utah.

10. CICINDELA TRANQUEBARICA HORICONENSIS Leng

St. George, April-May, 1917, 1921, 1922 (Tanner); June, 1919 (Knaus and Spalding); Zion National Park, 1919 (Knaus and Spalding); May, 1924 (Tanner); Shores of Great Salt Lake, June, 1915 (Sugden).

11. CICINDELA TRANQUEBARICA KIRBYI Lec.

Raft River Mountains, June, 1928 (Tanner); Logan, 1909 (E. G. Titus); Farr West, June, 1926 (Tanner); Bear Lake, near Lakota, June, 1926 (Tanner and Lynn, Hayward); Sheep Creek, Daggett County, June, 1926 (Tanner); Sinks and Dunes, South Lynndyl, September, 1926 (Tanner); Marysvalle, July, 1927 (Tanner); St. George, September, 1928 (Tanner); Bluff, July, 1927 (Tanner and Kartchner).

12. CICINDELA TRANQUEBARICA ADMISCENS Csy.

Price, June, 1927 (Tanner); Sheep Creek, June, 1926 (Lynn Hayward); Fort Bridger, Wyoming, June, 1926 (Tanner).

The nine specimens of this variety in my collection agree with the Casey specimens, but I question the advisability of separating these from the variety *kirbyi*. The color, pubescence, and elytral markings are variable in these two forms. I can find no distinctive morphological differences.

13. CICINDELA VIBEX var. INYO Fall

Zion National Park, September, 1916, June, 1917, August, 1920, August-September, 1922, August, 1925, 1926, 1927, 1928 (Tanner); June, 1919 (Knaus).

14. CICINDELA VIBEX var. OWENA Fall

Cicindela kirbyi var. *uintana* Csy. (type locality, Zion National Park)

Zion National Park, June, 1917 (Tanner); June and September, 1921, August, 1922, 1926, 1928 (Tanner); Iron Springs, Iron County, June, 1919 (Knaus).

I have had the opportunity of studying Colonel Casey's type of *uintana* and I am convinced that it is only a well-marked specimen of the variety *owena*. In the large series of *inyo* and *owena* of my collection from Zion Park there is a great deal of variation, depending upon the time of the year they are taken.

15. CICINDELA VIBEX var. MOAPANA Csy.

Provo, August 20 (Wickham).

Professor Wickham informs me that he collected this form of *vibex* at Provo, but I have never been able to distinguish this variety in specimens I have taken in Utah.

16. CICINDELA TENUICINCTA Schp.

East shore of Great Salt Lake, June 25, 1902 (Knaus); Saltair, June 21 (Wickham), September 26, 1925 (Tanner).

This species seems to be restricted in Utah to the shores of Great Salt Lake, where it is abundant.

17. CICINDELA LONGILABRIS Say

Emerald Lake, Mount Timpanogos, August, 1927 (Tanner).

This species is rarely found in Utah. I have never seen any of the green maculate specimens like the ones I have from Montana that have been taken in Utah. I doubt that *C. perviridis* has ever been taken in Utah and hence I am not including it in this list.

18. CICINDELA MONTANA Lec.

Cicindela montana var. *uteana* Csy. (type locality, Provo Canyon, Utah)

American Fork Canyon, 1876 (F. C. Bowditch); Aspen Grove, Mount Timpanogos, July and August, 1925, 1926, 1927 (Tanner); Deer Creek Canyon (Spalding); Greendale, Uinta Mountains, June, 1926 (Tanner); Uinta National Forest, August 3 (Silver); Park City,

August, 1927 (O. W. Olsen); Logan Canyon, June, 1926 (Tanner and C. Cottam); Deep Creek Mountains, June, 1928 (Tanner); Raft River Mountains, June, 1928 (D. E. Beck, Fred Richin and Tanner); Pine Valley Mountains, September, 1922 (Tanner); Paris Canyon, Idaho, July 2, 1920 (B. C. Cain); Lava Hot Springs, May, 1927 (Beck); Fort Bridger, Wyoming, June, 1926 (Tanner); Kaibab Forest, Arizona, July, 1927 (Tanner).

I agree with Professor Wickham that *montana* should be given specific rank. It is a distinctive species, though extremely variable, and is widely distributed throughout Utah. During the past summer (1928) I had the privilege of studying Colonel Casey's collection of Cicindelidæ, now in the National Museum. I have also recently submitted specimens of this group and other groups to Mr. L. L. Buchanan, who kindly studied them in connection with the Casey types. With this material before me I am convinced that most of the species and subspecies from Utah named by Casey in his last memoir (1924) should be placed in synonymy.

I have studied over a hundred specimens of *montana* and find some specimens with "subcupreous" heads and thorax and black elytra, while others have blackish heads and thorax and elytra that are subcupreous in color. The abdomens vary from dull greenish, blackish, bluish to blue-green. I have also taken the "subcupreous-brown" and black specimens in copula.

Mr. Knaus reports that he has specimens of *C. longilabris* var. *chamberlaini* Knaus and *C. longilabris* var. *vestalia* Leng, collected by Mr. Spalding in Provo Canyon. I have submitted specimens to Mr. Knaus, but he has not reported the results. I am unable to distinguish these varieties in my specimens; in fact since studying specimens of *vestalia* Leng I am inclined to believe that neither of these varieties are found in the Utah fauna.

19. CICINDELA LAURENTI Schp.

Parowan Canyon, July, 1921 (Knaus); Cedar Breaks, August, 1921 (B. C. Cain); La Sal Mountains, June, 1927 (Tanner, Call, Rasmussen, Kartchner).

A distinctive species. My nineteen specimens are uniform in color, markings and size.

20. Cicindela oregona Lec.

Provo (common from May until October); Riverdale, Weber River, June, 1926 (Tanner, Hayward, Cottam); Wellsville, June, 1926 (Tanner); Farr West, June, 1926 (Tanner); Logan, August, 1924 W. W. Henderson); Flaming Gorge, Green River, June, 1926 (Tanner); Douglass, Dinosaur Quarry, July, 1926 (Tanner); Aspen Grove, Mount Timpanogos, August, 1926-27 (Tanner); Thistle, Spanish Fork Canyon, July 22, 1922 (Tanner); Salt Creek Canyon, near Nephi, July 20, 1922 (Tanner); Sevier River at Lynndyl, July 26, 1922 (Tanner); Sinks and Dunes, South Lynndyl, September, 1927 (Tanner); Beaver, July, 1923 (Tanner); Callao, June, 1928 (Tanner); Mud Lake, Paris, Idaho, June, 1926 (Tanner, Hayward, Brown, Cottam); Mesa Verde National Park, Colorado, July, 1927 (Tanner and Call).

This species is common in the northern part of the state. Mr. Knaus reports that he has taken it at St. George and Zion Park, but I have never taken what I consider to be the true *oregona* in the Virgin River Valley.

21. Cicindela oregona guttifera Lec.

Sheep Creek, Duchesne County, June, 1926 (Tanner); Aspen Grove, July and August, 1925, 1926, and 1927 (Tanner); Provo Canyon (Knaus); Utah Lake (Tanner); Woodside, June 1927 Kartchner); Moab, May, 1928 (W. J. Gertsch); Mesa Verde National Park, Colorado, July, 1927 (Call, Kartchner, Tanner).

This form of *oregona* seems to be more in the Colorado River drainage area than in the Great Basin of Utah.

22. Cicindela oregona maricopa Leng

Cicindela provensis Csy. (type locality, Provo Canyon).
Cicindela provensis mormonella Csy. (type locality, Utah).
Cicindela provensis nephiana Csy. (type locality, Parowan, Utah).

St. George, June to August, 1921, 1922, and 1925 (Tanner); Pine Valley, June, 1922, 1929 (Tanner, Doyle, Liddle, and Tony Bentley); Central, June, 1921, 1922, 1923, 1925 and 1929 (Tanner); Mountain Meadows, June, 1923 (Tanner); Toquerville, June 15, 1924 (Tanner); Cedar City, July, 1922 (Tanner); Beaver, July, 1924 (Henderson); Utah Lake, May, 1928 (Tanner); Aspen Grove, Mount Timpanogos, July, 1926 and 1927 (Tanner); Brighton, August, 1926 (Sugden); Vineyard, July (Spalding); Parowan Canyon, July (Spalding).

Last summer while I was at the National Museum I studied the Casey types of the above forms and made careful notes. Since then Mr. Buchanan has kindly compared a number of specimens with each type. With these and several hundred

specimens of the *oregona* group for study I am forced to the conclusion that *C. provensis, C. p. mormonella,* and *C. p. nephiana* are only color phases of *C. o. maricopa* Leng. I have relaxed and studied scores of specimens in this group, but I have failed to find any constant morphological differences. While collecting specimens of this group I have paid special attention to their association and have found greenish and deep-blue specimens on the same sandy river bottom. In Zion Park I collected specimens that are identical with Casey's *provensis* that were in copula with specimens that have been identified as *maricopa.* Several color phases may be taken throughout the season in the same locality which suggests that they may be physiological responses to an environmental complex. Some workers, past and present, seem to take a delight in gathering and naming the fortuitous variations of taxonomic units. Mr. Spalding picked out his most likely variations and sold them to Colonel Casey!

23. CICINDELA OREGONA OREGONELLA Csy.

(Type locality, Deer Creek, Provo Canyon, Utah)

Aspen Grove, Mount Timpanogos, July (Tanner); Deer Creek, Provo Canyon (Spalding); Logan, August, 1924 (Henderson); Sinks and Dunes, South Lynndyl, September, 1926 (Tanner); St. George, May, 1922 (Tanner); Zion Park, August 25, 1925 (Tanner).

The specimens listed here under *oregonella* run in Casey's key (1913, p. 29), to *sonoma,* but since I do not have material that has been compared with *sonoma* I am referring my specimens to a form I have studied, *oregonella,* which may prove to be a synonym. In my specimens the elytra lack the punctures and are "densely microgranulate" and the surface is opaque, but never metallic. They vary in color above from black to dirty brownish and dull greenish, beneath greenish to deep blue. Four specimens from near Lynndyl are black opaque above and dull greenish beneath. The head and thorax, except on the lateral part, are devoid of hairs. This form seems to be distinct enough to warrant separating it from the three *oregona* groups listed above.

24. CICINDELA WILLISTONI var. ECHO Csy.

(Type locality, shores of Great Salt Lake, Utah)

Great Salt Lake, 1904 (Wickham), June, 1926 (Tanner, Brown,

Cottam, and Hayward), 1921 (Knaus); Stansbury Island, Great Salt Lake, July, 1913 (Pack, Hagen, and Titus); Sevier Lake, 1904 (Wickham); Little Salt Lake, Parowan, July, 1921 (Knaus); June, 1928 and 1929 (Tanner, Bentley, and Liddle).

This species is common around the salty lakes of Utah.

25. CICINDELA WILLISTONI SPALDINGI Csy.

(Type locality, Callao, Utah)

Callao, June (Spalding).

I have seen but one specimen of this unique, the type, and it seems distinct enough to be separated from other varieties of this group. In many ways it is more closely related to the *fulgida* group than to the *willistoni* units.

26. CICINDELA TANNERI Knaus

(Type locality, Green River, Utah)

Green River, June, 1927 (Tanner and Kartchner); Duchesne, July, 1926 (C. J. D. Brown).

This species was rather common on the alkali flats near the river.

27. CICINDELA PAROWANA Wickh.

(Type locality, Salt Lake near Parowan, Utah)

Cicindela parowana var. *remittens* Csy. (type locality, Callao, Utah)

Little Salt Lake, near Parowan, August 11 (Wickham); July (Knaus); June (Tanner); Callao, June 5 (Spalding).

I have had an opportunity of studying all of Mr. Spalding's specimens of *parowana* and *remittens,* and after studying Colonel Casey's type there is no doubt but that *remittens* is a color phase and one that is extremely variable. The Callao specimens are reddish, greenish and bluish in color.

28. CICINDELA NIGROCŒRULEA Lec.

St. George, August, 1922 (Tanner).

I have only taken three specimens of this species in my many years of collecting.

29. CICINDELA PUNCTULATA Oliv.

St. George, August, 1923 (Tanner); Parowan, July (Knaus).

This species is not common in Utah and is usually associated with *chihuahuæ.*

30. CICINDELA PUNCTULATA CHIHUAHUÆ Bates

St. George, August, 1922 and September, 1927 (Tanner); July, 1921 (Knaus); Bellevue (Engelhardt); Zion Park, July, 1922 (Tanner); Parowan Canyon, July, 1921 (Knaus and Spalding).

This form seems to be confined to the southwestern part of the state.

31. CICINDELA TENUISIGNATA Lec.

Ash Creek near La Verkin, June, 1922 (Tanner).

The single specimen of this species taken at La Verkin is small with fine markings.

32. CICINDELA LEMNISCATA Lec.

St. George, August, 1922 (Tanner).

Three specimens came to the electric lights one warm, cloudy night. This seems to be a new record for Utah.

33. CICINDELA CARTHAGENA var. HÆMORRHAGICA Lec.

Saltair, July, 1921 (Knaus), August 29, (F. H. Shoemaker); June, 1926 (Tanner); Salt Lake Valley (Morrison); 1904 (Wickham); Farr West, June, 1926 (Brown); Parowan, July, 1921 (Knaus).

Mr. Leng reports *hentziana* from Utah and cites as his authority specimens in the Harris collection now in the Museum of Comparative Zoölogy at Harvard. Professor Nathan Banks has the following to say of this form in a letter under date of April 10, 1929: "In his (Harris's) collection I do not find any specimens under *hentzi,* but in his catalogue I find one sheet with these words, 'identical with, or very closely allied to the form on page 4052 (that is *hentzi*).' On this sheet there are records of specimens from St. George, Utah, July, H. F. Wickham, and 25 June, L. H. Joutel, and against the latter is the collecter, 'Fuchs collection 772 and 773.' However, as I said, I did not find these specimens under *hentzi* in his collection, and he may have transferred them later elsewhere without changing the records."

I have never taken any specimens that agree with Leng's description of this variety.

34. CICINDELA CARTHAGENA BISIGNATA Dokh.

Saltair, June 26 (Wickham).

The only record of this species in Utah is one specimen in the Harris collection. I question the identification of the specimen.

35. CICINDELA CARTHAGENA ARIZONÆ Wickh.

St. George, 1917 to 1929 during the summer (Tanner); June, 1921 (Knaus); Zion Park, August, 1922 (Tanner).

This species seems to be confined to the Virgin River Valley. It is common throughout the summer.

36. CICINDELA PUSILLA var. IMPERFECTA Lec.

Provo, June (Wickham); Saltair, June (Wickham and Tanner); Farr West, June, 1926 (Tanner, Brown, and Hayward); Rosevere Creek, Raft River Mountains, June, 1928 (Tanner); Sevier River, near Lynndyl, June, 1922 (Tanner); Sevier Lake, June (Wickham); Parowan, June and July (Spalding, Knaus, and Tanner); Sheep Creek, Duchesne County, July, 1926 (Brown); Callao, June, 1928 (Tanner); Bear Lake, near Paris, Idaho, June, 1926 (Hayward and Tanner). Fort Bridger, Wyoming, June, 1926 (Tanner).

This species is extremely variable in color as well as markings.

37. CICINDELA PUSILLA var. CINCTIPENNIS Lec.

Miners Peak, July (Spalding); Sheep Creek, June (Brown and Hayward); Price, June, 1927 (Tanner); Douglass, Dinosaur Quarry, June (Brown and Hayward).

38. CICINDELA CALIFORNICA var. PRÆTEXTATA Lec.

St. George, August (Spalding, Wickham, Tanner).

This species has always been taken at night around the light.

39. CICINDELA SPERATA Lec.

Bluff, July, 1927 (Tanner and Kartchner).

This specimen was taken along the San Joaquin River. It is a new record for Utah.

40. CICINDELA TOGATA var. GLOBICOLLIS Csy.

Saltair, June 26 (Wickham).

Professor Banks writes the following concerning this variety: "Of *C. bisignata* and *C. globicollis* there are of each, one specimen from Saltair, 26 June, H. F. Wickham, collector."

SUMMARY

1. In this paper forty species are listed for Utah and ten forms are treated as doubtful or synonyms, thus bringing the list to fifty species that have been referred to the state.

2. Utah is the type locality for eleven of the fifty forms.

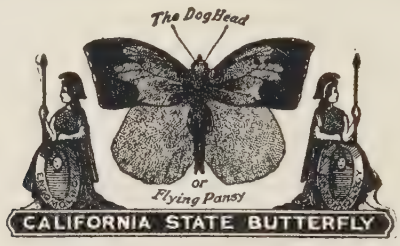
3. Specimens of forty-three of the fifty forms are in my collection of eight hundred and thirty specimens of Cicindelids.

A STATE BUTTERFLY FOR CALIFORNIA

BY J. D. GUNDER
Pasadena, California

Many states in the United States of America have officially designated or tentatively set aside what is popularly termed a "state flower." For example, California has long since chosen the poppy and Illinois the goldenrod. A number of states are going a step further and recognizing a state bird to represent their ornithological preference. The bird authorities of this commonwealth are still wrangling over the question of which species will be selected, but in all probability, according to latest reports, one of the California Quail family will be chosen.

During the last fifteen years, as everyone knows, there has been a marked advance in the science of entomology. The



The emblem

public at large is beginning to know what the term means and to recognize its importance. More interest is being shown by the press in the things that entomologists do. In other words, entomology is gradually becoming as significant to the public as ornithology and botany. Perhaps it will some day have more appeal. Its status in relation to man's existence is certainly closer in many respects. The more the attention of the general public can be focused on entomology the better. It was with these thoughts in mind that the Lorquin Entomological Society of Los Angeles has sought to establish a state insect for California and to have this state be the first in the entomological field to record a local symbol of its science.

At a society meeting during the fore part of this year it was decided that one of the diurnal lepidoptera would be the most

suitable and popular of all insects in general with the public. Butterflies have always held the imaginative fancy of the people; also there are perhaps more students interested in lepidoptera than in any other order. Three well-known butterflies occurring in California were selected on which a state-wide ballot was taken. The three were: *Heterochroa californica* Butl., the "California Sister"; *Zerene eurydice* Bdv., the "California Dog Head," or "Flying Pansy"; and *Basilarchia lorquini* Bdv., the "Lorquin's Admiral." Especially printed, return postcard ballots were sent to every known person really interested in entomology in the state. Names and addresses were obtained from the Natural History Society of San Diego, the Lorquin Society files, the Pacific Coast Entomological Society of San Francisco, the Government's State Economic List through the courtesy of Mr. Campbell of Alhambra, the University of California List (both at Davis and at Berkeley), and from other sources, including dealers' lists. Prof. L. J. Muchmore of the Entomological Department of the Los Angeles Museum attended to the receipt and count of the cards. Thus every entomologist who cared to vote on the subject had the chance to do so. The result of the ballot was as follows: seventy-seven cards were returned showing a preference for the "California Dog Head" butterfly and eleven showing a choice for the "California Sister." No cards were marked in favor of the "Lorquin's Admiral." Thus the active entomologists of the state chose the "California Dog Head," or better named, the "Flying Pansy" for their state butterfly. Practically everyone who received a ballot cast a vote which showed a genuine interest in the undertaking.

Zerene eurydice Bdv. is strictly a native California butterfly, its habitat being the lower mountains, from the Mexican border north to the San Francisco Bay region. It is particularly common in the San Bernardino mountains of southern California, where it flies mostly during June and July. The early stages were worked out years ago by W. H. Edwards, who illustrated the egg and larva in his "Butterflies of North America." For good illustrations of the typical species see Holland's, Wright's, or Comstock's books with their colored plates. *Eurydice* is a pretty butterfly, the male being orange

and black in color with a striking and easily remembered design, while the female is straight orange without pattern. Thousands of specimens are used each year in entomological art work for trays, bookends, plaques, etc., so the species is already fairly well known to the public.

The seal

To record and popularize California's new state butterfly, an emblem and a seal is needed to validate its announcement. The illustrations accompanying this article suggest designs for both. Either may be used at will by entomologists. The more often the better. The emblem makes a good letterhead embellishment, while the seal can be used by societies and state institutions when occasion demands. The original designs and the original zinc cuts are deposited with the Lorquin Society at the Los Angeles Museum and are available, upon demand, to responsible parties who may wish to borrow them.

The State of California and the entomologists of this state are to be congratulated upon being the first in the Union to select and symbolize a state insect, or rather, a state butterfly.

SOME HEMIPTERA TAKEN BY PROFESSOR COCKERELL IN THE ORIENT

BY E. P. VAN DUZEE

Professor T. D. A. Cockerell has sent to me for study a small lot of Hemiptera representing a portion of his work in the Orient during 1928. He has very generously allowed me to retain the specimens for the collection of the California Academy of Sciences, which already has a very good representation of Oriental insects. It has seemed necessary for me to describe as new one genus and three species from this lot, and some of the others have proved interesting from the standpoint of geographical distribution.

SCUTELLERIDÆ

TECTOCORIS DIOPHTHALMUS Thunberg

Bourail, New Caledonia, May 22 (W. P. Cockerell). One larva, about half-grown. It is bronzed black with the head, pronotal callosities, apex of elytral pads, abdomen and legs deep steel blue, the coxæ tipped with ferruginous.

SCUTIPHORA PEDICELLATA Klug

Sydney, New South Wales. One fine large specimen taken in the Hotel Grosvenor.

PENTATOMIDÆ

SCOTINOPHARA OBSCURA Dallas

Chiengmai, Siam, April 6, 1928 (Dr. McKean), one example, certainly pertaining to Dallas' species and not to *lurida*.

Genus **Kyrtalus** Van Duzee, n. gen.

Allied to *Paramecocoris* Stål, 1861. Long, oval, depressed margins of head and thorax explanate. Head broad, flat semicircular in outline, narrower than base of scutellum, its length three-fourths that of pronotum on median line; cheeks contiguous before the small pointed tylus; ocelli a little more distant from one another than from the eyes; bucculæ low, feebly elevated anteriorly; rostrum not attaining intermediate coxæ; segment I reaching apex of bucculæ; II shorter than III and IV together; III longer than IV. Sides of pronotum broadly explanate, gently arcuate, entire; humeri and anterior angles rounded, anterior margin deeply excavated for reception of head, immarginate, hind margin scarcely arcuate before base of scutellum. Scutellum large, passing middle of abdomen, narrowed

at apex, frenum nearly attaining the apical fourth. Elytra narrower than abdomen, leaving connexivum exposed; costa expanded basally; membranal nervures becoming obsolete at base and apex. Osteolar canal long, curved, nearly attaining margin of the large oval, wrinkled opaque area; mesosternum broadly sulcate. Venter slightly convex, flattened along median line; base of segment II unarmed. All femora with a few small teeth below near apex; all tibiæ broadly sulcate. Antennæ five-segmented, I thickened, curved, scarcely passing the foliate margin of head; II and V subequal; IV longer than III but shorter than V; V fusiform. Surface above and sides beneath coarsely punctate.

Type of genus *Kyrtalus mackiei* Van D.

This insect runs in Stål's table to the African genus *Paramecocoris* Stål, 1861, (= *Delegorguella* Spinola), but the head is more expanded and regularly arcuate before, the tylus is smaller, the antennæ and rostrum are shorter, the osteolar canal is much longer and the upper surface is more coarsely punctured.

It should be noted that Stål established his genus *Paramecocoris* in 1853 as a substitute for the preoccupied name *Paramecus* Fieber, 1851; it must therefore take the same type species and must replace *Burma* of Kirkaldy. *Paramecocoris* of Stål, 1861 and 1864, seems to be quite a different genus and equivalent to *Delegorguella* Spin., 1850, as pointed out by Kirkaldy.

Kyrtalus mackiei Van Duzee, n. sp.

Brownish testaceous, coarsely irregularly punctured with brown or black. Length, 10 mm.; width, 5 mm.

Head flat with coarse irregular punctures, leaving a smooth area between the ocelli and eyes that is crossed by an oblique line of contiguous punctures; apex of head entire, the cheeks meeting for one-third the length of the head; eyes brown, ocelli red; edge of head with a black line from eyes halfway to apex. Pronotum with an obsolete impressed transverse line terminating in a whitish calloused spot placed its own width within the margin; callosities a smooth annulus including an oval smooth area between them; punctures sparse on lateral margin anteriorly, finer and denser toward the humeri. Scutellum with a smooth spot within the basal angles, apex narrow, rounded, punctured to the tip. Elytra irregularly punctured, leaving a few scattering smooth spots, punctures coarser and blacker within the radial nervure; membrane moderately enfumed, nervures fuscous and distinct only along the median field; connexivum brown-punctate, with a large pale median area resting on

the margin of each segment. Antennæ with a fuscous annulus covering much of segment III; apex of rostrum and clavus black. Meso- and metapleuræ with a brown opaque area; lateral areas of pleuræ and venter brown-punctate; margin of venter smooth with a black spot at the incisures; hind edge of sixth segment with an obtusely angulate median tooth or rounded lobe, the disk with a brown mark either side at base. Described from the unique type.

Holotype, female, No. 2619, Mus. Calif. Acad. Sci., taken July 17, 1928, on **Mount Pah Meeung, Siam,** by Miss Alice Mackie, after whom the species is named.

STOLLIA LEREDDI Guillou

Thursday Island, March 15. A single specimen taken by Miss Alice Mackie. This agrees in every particular with Stål's description of his *Stollia fasciolata* which Schouteden places as a synonym of *lereddi.* It has been recorded from North Queensland and Papua between which Thursday Island lies.

CARBULA TRUX Breddin

Doi Sutep, Siam, February 8, one female taken by Alice Mackie. It agrees altogether with Breddin's description of his male specimen from Java ("Archiv. f. Naturges.," LXXVIII, Abt. A., p. 102, published in February, 1913).

Menida cockerelli Van Duzee, n. sp.

Size and form of *varipennis* Westw. Ochraceous more or less tinged with croceous, especially on the pronotum, coarsely punctured with black, beneath with a black median vitta, interrupted on the venter between the segments. Length, 6 mm.

Head with six lines of black punctures, the lateral following the margin, deflected about the eyes and ending in a black spot between the ocellus and eye; beneath with a polished black spot before the antennal base and a cluster of black punctures behind it. Pronotum with a submarginal row of black punctures and a row about the callosities, broken behind; posterior disk tinged with luteous, with scattering coarse black punctures. Scutellum coarsely, sparsely black-punctate, with a pale smooth spot within the basal angles and a blackish subapical spot on either side. Elytra coarsely fusco-punctate; membrane hyaline. Tergum black with a pale margin. Antennæ pale; segment II and base of III blackish above. Beneath pale testaceous yellow with a broad lateral area of scattering black punctures; stigmata black; median vitta on sternum and venter deep black, on the venter broken into segmental spots that on segment II extended anteriorly into a sutural vitta nearly attaining the con-

nexivum; on other segments this line is indicated. Legs and rostrum pale, the latter infuscated at tip which attains the hind coxæ; basal spine of abdomen reaching to between intermediate coxæ.

Holotype, female, No. 2620, Mus. Calif. Acad. Sci., taken by Professor T. D. A. Cockerell, December 27, 1928, at **Nan, Siam.**

This species approaches *pundaluoyæ* Distant from Ceylon, but seems to be sufficiently distinct.

Plascosternum tumidum Van Duzee, n. sp.

Closely allied to *taurus*, a little larger and darker, with the same form of humeral angles; cheeks tumidly elevated; apex of scutellum narrower and more produced, with a different form of genital plates in the female. Length, 24 mm.; width across humeri, 18 mm.

Cheeks tumidly elevated; basal angle of the notch on the bucculæ prominent and acute, as is the caudal angle of the bucculae; these angles rounded in *taurus*. Segment II of antennæ distinctly shorter than III, scarcely shorter in *taurus* (possibly a variable character), III and IV equal. Mesosternal plate attaining middle of prosternum, reaching to its base only in *taurus*. Apex of scutellum narrower and more produced than in *taurus*, its length beyond apex of frenum one-fifth greater than its width there, in *taurus* these measurements are subequal. Venter with a shallow median groove. Basal genital plates quite strongly produced on their median angle, leaving the hind edge quite strongly sinuate, in *taurus* their hind edge is straight across, with no extension of their inner angles; all the plates more densely covered with pale hairs.

Color in the type darker than in *taurus* with a very slight pinkish tinge, especially on the inner apical field of the corium and base of the scutellum. Antennæ pale, impunctate, the most of segment I, II and III fuscous with pale incisures, IV and V black on apical half, in *taurus* the antennæ are coarsely punctate with brown and annulate with brown at apex.

Holotype, female, No. 2621, Mus. Calif. Acad. Sci., taken by Professor Cockerell, January 17, 1928, at **Pah Meeung, Siam.**

My material of *taurus* is from Java and is inadequate to show the extent of variation normal to the species, but the characters enumerated seem sufficient to give the present form specific standing. The Academy of Sciences has one male labeled "Batavia, Java," that has all the characters enumerated for this new form applicable to the male, but the cheeks are less strongly

tumid. In this male the genital segment is deeply roundedly excavated at apex. Length of this male, 17 mm.

MEGYMENUM INSULARE Westwood

Thursday Island, March 15, collected by Miss Alice Mackie and J. D. Foote. This species has the thoracic angles less prominent than in *subpurpurascens* and the surface is opaque black wanting the purple luster of that species.

COREIDÆ

PETILIA CALCAR (Dallas)

Lonquang, Siam, December 23, one specimen collected by Professor Cockerell.

PLINACHTUS sp.

Thursday Island, March 15, 1928 (T. D. A. Cockerell), one example that is too mutilated for certain determination; the genus, even, is in some doubt.

LEPTOCORISA ACUTA Thunberg

Mount Pah Meeung, Siam, January 17, 1928 (T. D. A. Cockerell), one example.

REDUVIIDÆ

SPHEDANOLESTES TRICHROUS Stål

Doi Sutep, Siam, February 10, 1928 (Miss Alice Mackie). Stål described this beautiful red and black species from "India Orientalis." Distant did not know the species when he wrote the Hemiptera portion of the Fauna of British India, and on a cursory hunt I have not found it recorded elsewhere. The present record places it definitely in Indo-China.

DERBIDÆ

PARAPROUTISTA CERAMENSIS Muir

Mount Pah Meeung, Siam, January 18, 1928 (T. D. A. Cockerell), one example. Mr. Muir described the species from the island of Ceram and from British New Guinea. The present record extends its range to Indo-China.

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Editor's Comment

In *Science* for November 8, Professor G. F. Ferris raises the question, in his usual forceful way, whether the expenditure of so much money by the state and federal governments on insect quarantine and eradication really pays. This query naturrally suggests a reply, and Professor Ferris' own state furnishes the best answer. Should the Mediterranean fruit fly become established in this state the financial loss to the fruit growers of the state, great as it would be, would not be all California would pay. The real price would be paid by each man, woman and child while picking the maggots out of the fruit they wished to eat. True, these maggots are not poisonous and may be eaten with impugnity, but not being insectivorous birds we do not wish to eat them and the constant avoidance of them would soon become intolerable. California, on account of its climate and the extent of its fruit industries, is peculiarly susceptible to injury by the fruit fly and other insect pests against which this state is quarantined, and that they have been kept out for so long is due to the honest and efficient enforcement of the quarantine regulations established by our State Department of Agriculture. The least we can do is to uphold them and not hamper them by raising doubts in the minds of state officials whose training has been along other lines.

Fourteen butterfly enthusiasts met in the Board Room of the Mechanics' Institute in San Francisco on October 26 and organized a San Francisco Butterfly Club. Dr. L. I. Hewes was elected chairman. Mr. J. E. Cottle told of his early experiences in entomology, and the others present gave some account of their interest in butterfly collecting and what had aroused that interest. This was followed by an exhibition of interesting specimens. Further meetings will be at the call of the Chair.